Simulation Optimization Of A Supply Chain With Globally Shared Inventory Profiles

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Information and Communication Technologies: From Theory to Applications, 2004. Proceedings. 2004 International conference;Publication Date: 19-23 April 2004;ISBN: 0-7803-8482-2

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Summary

We develop a discrete-event simulation model a three-stage supply chain consisting of a single product, a retailer, a distributor, and a factory. The factory it gets raw materials from an outside supplier, which is not included in this current model. Demand at the retailer follows a random distribution. The retailer carries inventory and replenishes his stock from the distributor according to a (s, S) policy; that is, when inventory position at the retailer reaches s, an order. The order size equals the difference between the inventory capacity S and the actual inventory level. We assume that excess demand is backordered at the retailer. When the retailer places an order, the distributor satisfies the full order immediately upon availability. If not enough stock is available the excess order is fully or partially backordered and hence will experience a random delay. Delayed retailer orders are satisfied on a first-come, first-served basis. In addition to the possible random delay at the distributor, the transit time from the supplier to the retailer is random. We also assume that the distributor has online information on the inventory status and demand activities of the retailer and replenishes his stock from a factory. The factory also has access to the distributor demand and inventory profiles. The factory follows the economic production quantity (EPQ) policy and he gets the material from an outside source.